

Fire Disturbance Working Group Breakout

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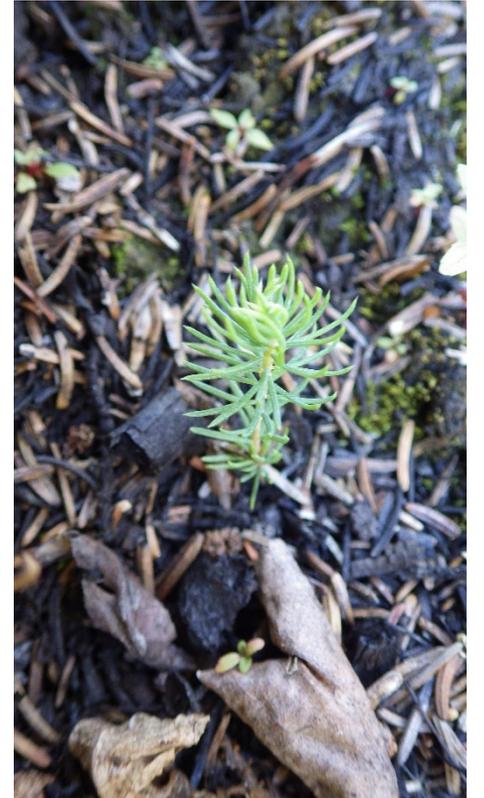
Fire Disturbance Working Group

Current Synthesis Activities – **Boreal Only**

- Wildfire soil carbon combustion synthesis
- Post-fire forest regrowth composition & trajectories (*with Veg Dynamics WG*)

Need to conduct a tundra fire synthesis, but resource limited. Will look into:

- Workshop proposal
 - TWISK (sp?)
1. Need to develop resiliency framework for tundra fire
 2. Post-fire tundra revegetation (tussocks, shrubs, bryophytes) – *Liza Jenkins*
 3. Tundra combustion synthesis – *Xanthe Walker*
 4. Post-fire tundra hydrology (ALT, soil moisture, subsidence) Lead?
- Current ABoVE tundra fire efforts are focused on Alaska – need to look into Canadian tundra fire
 - Potential tundra fire datasets to include: Loboda, Schafer, Go I., Mack, Frost, Amy Breen, Natali, Brent Thorne, (NGEE), ...



New Fire Disturbance Synthesis Ideas

1. Boreal recruitment failure – 10% of synthesis data shows no tree recruitment – *Jenn Baltzer*
 - a) What are the drivers?
 - b) What are the sites transitioning to?
 - c) Can these changes occur due to one fire event or only repeated burns?
 - In northern Alberta sites of Ellen Whitman reburned areas are shifting to grass
2. Future crosscutting activities – *some aspects addressed in Phase 2 grants*
 - Wildfire-permafrost
 - Wildfire-health
 - Wildfire-shrub-snow
 - Accounting for fire in modelling



How Might Data Inform Management Needs?

- Phase 2 Research to Operations (Fire Land Managers) Workshop
 - Follow-on to 2017 “Opportunities to Apply Remote Sensing in Boreal/Arctic Wildfire Management & Science: A Workshop”
 - 1.5 days before/after the 6th ABoVE Science Team Meeting in Fairbanks, AK
 - Interface with managers and scientists
 - Stakeholder engagement – Fire managers from AK and CAN
 - Soil moisture from remote sensing
 - Knowledge of burn severity to the surface organic layers
 - etc
 - Consortium can lead workshop proposal (Randi Jandt & Alison York)

New Wildfire Articles

- Environmental characteristics interact with fire to shape boreal forest plant community assembly: the importance of soil moisture and regeneration traits for information legacies *Day et al. In prep Ecology*
- Losing Legacies, Ecological Release, and Transient Responses: Key Challenges for the Future of Northern Ecosystem Science *Turetsky et al 2017 Ecosystems*
- Ecological Response to Permafrost Thaw and Consequences for Local and Global Ecosystem Services *Schuur and Mack 2018 Annual Review of Ecology, Evolution, and System.*
- Wildfire severity reduces richness and alters composition of soil fungal communities in boreal forests of western Canada *Day et al. 2019 Global Change Biology*
- Increasing wildfires threaten historic carbon sink of boreal forest soils *Walker et al in Review Nature*
- R. J. Michaelides, K. Schaefer, H. A. Zebker, A. Parsekian, L. Liu, J. Chen, S. Natali, S. Ludwig, and S. R. Schaefer, *ERL, 2019*
- Soil organic layer combustion in boreal black spruce and jack pine stands of the Northwest Territories, Canada *Walker et al. 2018 International Journal of Wildland Fire*
- Cross-scale controls on carbon emissions from boreal forest mega-fires *Walker et al. 2018 Global Change Biology*
- Greenhouse gas forcings (Rogers et al., in prep)

New Wildfire Articles

- Influence of fire frequency, harvest, and ecosystem characteristics in the southern boreal (Dieleman et al., in prep)
- Modeling post-fire albedo under current & future climates (Potter et al., submitted shortly)
- Using combustion synthesis to model combustion across the ABoVE domain Rogers et al. in prep Earth Systems Science Data
- Regeneration Synthesis Baltzer et al. In prep Nature Climate Change
- Combustion Synthesis. Walker et al. In prep Nature Geosciences
- Climate Warming and Fire will Drive Expansion of High-Latitude Deciduous Plants and Decrease NBP Mekonnen et al. in review
- Developing a Landsat-8 algorithm for surface organic layer burn severity retrieval. French et al. to be submitted soon
- Analysis of Field data from 2014-15 NWT Wildfires on Peat Consumption and Tree Recruitment reveal Post-Fire Successional Trajectories. Kane et al. in prep
- Developing peatland soil moisture retrieval from C-band Polarimetric SAR data. Bourgeau-Chavez et al. in prep.
- Comparing patterns of wildfire severity in peatlands and uplands across NWT Shield and Plains . Bourgeau-Chavez et al, in prep
- Refinement of C-band soil moisture retrieval algorithms for regenerating fire-disturbed boreal ecosystems. Battaglia et al. in prep